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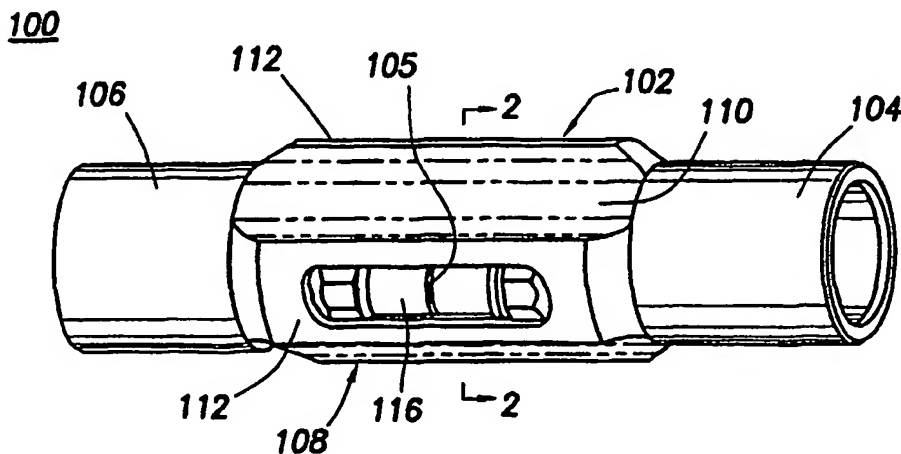
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[Continued on next page]

(54) Title: APPARATUS AND METHODS FOR SEPARATING AND JOINING TUBULARS IN A WELLBORE



(57) Abstract: The present invention provides methods and apparatus for cutting tubulars in a wellbore. In one aspect of the invention, a cutting tool having radially disposed rolling element cutter is provided for insertion into a wellbore to a predetermined depth where a tubular therearound will be cut into an upper and lower portion. The cutting tool is constructed and arranged to be rotated while the actuated cutters exert a force on the inside wall of the tubular, thereby severing the tubular therearound. In one aspect, the apparatus is run into the well on wireline which is capable of bearing the weight of the apparatus while supplying a source of electrical power to at least one downhole motor which operates at least one hydraulic pump. The hydraulic pump operates a slip assembly to fix the downhole apparatus within the wellbore prior to operation of the cutting tool. Thereafter, the pump operates a downhole motor to rotate the cutting tool while the cutters are actuated.

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A. CLASSIFICATION OF SUBJECT MATTER IPC 7 E21B29/00 E21B43/10 E21B33/04 E21B33/14 E21B17/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 E21B B23D B26D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1 739 932 A (ERCOLE VENTRESCA) 17 December 1929 (1929-12-17)	1,2
Y	page 1, line 91 -page 2, line 40; figures	5,6
X	US 1 952 652 A (BRANNON ROBERT D) 27 March 1934 (1934-03-27)	1-4,7
Y	page 1, line 58 - line 78; figures page 2, line 35 - line 93	5,6,8,9
Y	WO 00 37766 A (ASTEC DEV LTD ;SIMPSON NEIL ANDREW ABERCROMBI (GB)) 29 June 2000 (2000-06-29) page 29, line 9 - line 26; figures abstract	8,9
X	US 2 695 449 A (CHAUVIN WILLIE L) 30 November 1954 (1954-11-30) claim 1; figures	1-4
-/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>*Z* document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search <div style="text-align: center; font-size: 1.2em;">30 October 2002</div>		Date of mailing of the international search report <div style="text-align: center; font-size: 1.2em;">08.11.2002</div>
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3018		Authorized officer <div style="text-align: center; font-size: 1.2em;">Weiland, T</div>

INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 1 358 818 A (ELLIS BERING ROBERT) 16 November 1920 (1920-11-16)	1,2
A	page 1, line 64 - line 75; figures page 1, line 98 - line 102 page 3, line 1 - line 45	10
A	US 4 389 765 A (THOMPSON JR FLOYD M) 28 June 1983 (1983-06-28) column 2, line 12 - line 20; figures column 2, line 47 - column 3, line 54	10
A	WO 00 37767 A (PETROLINE WELLSYSTEMS LTD ;ASTEC DEV LTD (GB)) 29 June 2000 (2000-06-29) abstract; figures	1
A	US 3 498 376 A (SCHWEGMAN HARRY E ET AL) 3 March 1970 (1970-03-03) abstract; figures	13-16
A	SU 976 019 A (VNII KREPLENIYU SKVAZHIN BUROV) 23 November 1982 (1982-11-23) figures	13
A	US 5 787 984 A (MABILE CLAUDE) 4 August 1998 (1998-08-04) column 3, line 64 - column 4, line 16; figures	13
E	WO 01 83943 A (SCHLUMBERGER HOLDINGS LTD SHL;SCHLUMBERGER SERVICES LTD SSL; NICHOLSON) 8 November 2001 (2001-11-08) abstract; figures	17-20
E	US 6 354 373 B1 (SOREM ROBERT M ET AL) 12 March 2002 (2002-03-12) abstract; figures	17
E	US 2002/139540 A1 (LAURITZEN ERIC) 3 October 2002 (2002-10-03) abstract; figures	17
P,A	WO 01 60545 A (STEWART BRUCE R ;COOK ROBERT LANCE (US); HAUT RICHARD CARL (US); B) 23 August 2001 (2001-08-23) page 10, line 20 - page 11, line 10; figures	18,24
P,X	GB 2 350 137 A (BAKER HUGHES INC) 22 November 2000 (2000-11-22) page 6, line 11 - line 24; figures	23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 01/04950

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-12

Apparatus for cutting a tubular

1.1. Claims: 10-12

Selfcontained cutting apparatus

2. Claims: 13-16

Apparatus and method for setting a liner

3. Claims: 17-22

A tubular with differing wall thickness

4. Claims: 23-25

A tubular section with an aperture and cementing method

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 1739932	A	17-12-1929	NONE	
US 1952652	A	27-03-1934	NONE	
WO 0037766	A	29-06-2000	AU 1867900 A	12-07-2000
			AU 1868700 A	12-07-2000
			AU 1868800 A	12-07-2000
			AU 1868900 A	12-07-2000
			AU 1876600 A	12-07-2000
			AU 1876800 A	12-07-2000
			EP 1147287 A2	24-10-2001
			EP 1141517 A1	10-10-2001
			EP 1141515 A1	10-10-2001
			EP 1144802 A2	17-10-2001
			EP 1151180 A1	07-11-2001
			EP 1141518 A1	10-10-2001
			WO 0037766 A2	29-06-2000
			WO 0037771 A1	29-06-2000
			WO 0037768 A1	29-06-2000
			WO 0037767 A2	29-06-2000
			WO 0037772 A1	29-06-2000
			WO 0037773 A1	29-06-2000
			GB 2345308 A	05-07-2000
			GB 2346632 A	16-08-2000
			GB 2346400 A	09-08-2000
			GB 2346909 A	23-08-2000
			GB 2347445 A	06-09-2000
			NO 20012596 A	27-07-2001
			NO 20012597 A	27-07-2001
			NO 20012598 A	30-07-2001
			NO 20012599 A	30-07-2001
			NO 20012600 A	30-07-2001
			NO 20012865 A	07-08-2001
			US 2002145281 A1	10-10-2002
			US 2002079106 A1	27-06-2002
			US 2002060079 A1	23-05-2002
			US 2002112338 A1	22-08-2002
US 2695449	A	30-11-1954	NONE	
US 1358818	A	16-11-1920	NONE	
US 4389765	A	28-06-1983	NONE	
WO 0037767	A	29-06-2000	AU 1867900 A	12-07-2000
			AU 1868700 A	12-07-2000
			AU 1868800 A	12-07-2000
			AU 1868900 A	12-07-2000
			AU 1876600 A	12-07-2000
			AU 1876800 A	12-07-2000
			EP 1147287 A2	24-10-2001
			EP 1141517 A1	10-10-2001
			EP 1141515 A1	10-10-2001
			EP 1144802 A2	17-10-2001
			EP 1151180 A1	07-11-2001
			EP 1141518 A1	10-10-2001
			WO 0037766 A2	29-06-2000
			WO 0037771 A1	29-06-2000

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/GB 01/04950

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0037767	A	WO 0037768 A1	29-06-2000
		WO 0037767 A2	29-06-2000
		WO 0037772 A1	29-06-2000
		WO 0037773 A1	29-06-2000
		GB 2345308 A	05-07-2000
		GB 2346632 A	16-08-2000
		GB 2346400 A	09-08-2000
		GB 2346909 A	23-08-2000
		GB 2347445 A	06-09-2000
		NO 20012596 A	27-07-2001
		NO 20012597 A	27-07-2001
		NO 20012598 A	30-07-2001
		NO 20012599 A	30-07-2001
		NO 20012600 A	30-07-2001
		NO 20012865 A	07-08-2001
		US 2002145281 A1	10-10-2002
		US 2002079106 A1	27-06-2002
		US 2002060079 A1	23-05-2002
		US 2002112338 A1	22-08-2002
US 3498376	A	03-03-1970	NONE
SU 976019	A	23-11-1982	SU 976019 A1 23-11-1982
US 5787984	A	FR 2735523 A1	20-12-1996
		EP 0748925 A1	18-12-1996
		NO 962489 A	16-12-1996
WO 0183943	A	FR 2808557 A1	09-11-2001
		AU 6026801 A	12-11-2001
		WO 0183943 A1	08-11-2001
US 6354373	B1	12-03-2002	NONE
US 2002139540	A1	03-10-2002	WO 02077411 A1 03-10-2002
WO 0160545	A	AU 3826301 A	27-08-2001
		GB 2373468 A	25-09-2002
		WO 0160545 A1	23-08-2001
GB 2350137	A	AU 3023000 A	23-11-2000
		CA 2307538 A1	20-11-2000
		GB 2359837 A ,B	05-09-2001
		NO 20002585 A	21-11-2000
		US 2002079101 A1	27-06-2002
		US 2001020532 A1	13-09-2001